Installation Manual

PT-602CZ Camera

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Proper Disposal of Electrical and Electronic Equipment (EEE)

The European Union (EU) has enacted Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE), which aims to prevent EEE waste from arising; to encourage reuse, recycling, and recovery of EEE waste; and to promote environmental responsibility.

In accordance with these regulations, all EEE products labeled with the “crossed out wheeled bin” either on the product itself or in the product literature must not be disposed of in regular rubbish bins, mixed with regular household or other commercial waste, or by other regular municipal waste collection means. Instead, and in order to prevent possible harm to the environment or human health, all EEE products (including any cables that came with the product) should be responsibly discarded or recycled.

To identify a responsible disposal method where you live, please contact your local waste collection or recycling service, your original place of purchase or product supplier, or the responsible government authority in your area. Business users should contact their supplier or refer to their purchase contract.

Important Instructions and Notices to the User:

Modification of this device without the express authorization of FLIR Commercial Systems, Inc. may void the user’s authority under FCC rules to operate this device.

Note 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna;
- Increase the separation between the equipment and receiver;
- Connect the equipment into an outlet on a circuit different from that of the receiver; and/or
- Consult the dealer or an experienced radio/television technician for help.

Note 2: This equipment was tested for compliance with the FCC limits for a Class B digital device using a shielded cable for connecting the equipment to an analog video output to a monitor and using a shielded USB cable for connecting the equipment to a personal computer. When making such connections, shielded cables must be used with this equipment.

Industry Canada Notice:
This Class B digital apparatus complies with Canadian ICES-003.

Avis d’Industrie Canada:
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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1 PT-602CZ Camera Installation

The PT-602CZ is a pan/tilt thermal security camera for medium- to long-range applications and can be used with traditional analog video installations or IP video networks. It incorporates a high-sensitivity thermal camera and a long-range daylight camera with a precision pan/tilt platform.

The PT-602CZ camera includes a cooled, high-performance thermal imager which is optimized for medium- to long-range surveillance.The thermal imager brings together a sensitive third generation mid-wave FPA detector with 640x512 pixels, powerful video-processing electronics, and continuous zoom optics incorporated into a compact package.

This manual describes the installation of the PT-602CZ cameras. If you have questions that are not covered in this document, or need service, contact FLIR customer support.
http://support.flir.com/
Phone - US: 888.747.FLIR (888.747.3547)
International: +1.805.964.9797.

This manual includes the following topics:

- Installation Overview
- Mounting the camera and its components
- Connecting the electronics
- Basic configuration and operation

For safety, and to achieve the highest levels of performance from the camera system, always follow the warnings and cautions in this manual when handling and operating the PT-602CZ.

1.1 Warnings and Cautions

WARNING!

If mounting the PT-602CZ camera on a pole, tower or any elevated location, use industry standard safe practices to avoid injuries.

Caution!

Except as described in this manual, do not open the PT-602CZ camera for any reason. Disassembly of the camera (including removal of the cover) can cause permanent damage and will void the warranty.

Be careful not to leave fingerprints on the PT-602CZ camera's infrared optics.

The PT-602CZ camera requires a power supply of 24 Volts. Operating the camera outside of the specified input voltage range or the specified operating temperature range can cause permanent damage.

When lifting the PT-602CZ camera use the camera body and base, not the tubes.

1.2 References

- Nexus IP Camera Configuration Guide (FLIR document # 427-0030-00-28)

- PT-602CZ Mechanical Interface Control Document (ICD) available on the documentation CD or from the FLIR website (FLIR document # T1002.M100- ICD PT 602 CZ)

1.3 Installation Overview

The PT-602CZ Camera is a multi-sensor camera system on a pan/tilt platform. Combinations of an infrared thermal imaging camera and a visible-light video camera are intended for outdoor installations.

Figure 1-1: PT-602CZ Camera

The PT-602CZ camera is intended to be mounted on a medium-duty fixed pedestal mount or wall mount commonly used in the CCTV industry. Cables will exit from the back of the camera housing. The mount must support up to 45 LBS. (20 KG).

The PT-602CZ camera is both an analog and an IP camera. The video from the camera can be viewed over a traditional analog video network or it can be viewed by streaming it over an IP network using MPEG-4, M-JPEG and H.264 encoding. Analog video will require a connection to a video monitor or an analog matrix/switch. The IP video will require a connection to an Ethernet network switch, and a computer with the appropriate software for viewing the video stream.

The camera can be controlled through either serial or IP communications.
The camera operates on 20 - 30 VAC or 21 - 30 VDC.

Important Note

Install all cameras with an easily accessible Ethernet connection to support future software upgrades.

In order to access the electrical connections and install the cables, it is necessary to temporarily remove the back cover of the camera housing.

Important Note

To account for pixel variations across the detector array (640x512 = 327,680 pixels), it is recommended a NUC operation is executed each time the camera is powered up, and periodically or as needed after that to improve the quality of the image. Refer to section 2.5.2 “Non- Uniformity Correction (NUC)” on page 2-5.

1.4 Installation Components

The PT-602CZ camera includes these standard components:

- Multi-sensor Pan/Tilt Camera Unit
- Cable Glands and Spare Parts kit
- FLIR Sensors Manager CD
- PT-602CZ Camera Documentation Package (including Documentation CD)

The installer will need to supply the following items; the lengths are specific to the installation.

- Electrical wire, for system power. Refer to section 1.9 “Electrical Connections” on page 1-7 for additional information)
- Camera grounding strap
- Coaxial RG59U video cables (BNC connector at the camera end) for analog video
- Shielded Category 6 Ethernet cable for control and streaming video over an IP network; and also for software upgrades.
- Optional serial cable for serial communications.
- Miscellaneous electrical hardware, connectors, and tools

1.5 Location Considerations

The camera will require connections for power, communications (IP Ethernet, and/or RS232/RS422}, and video (two video connections may be required for analog video installations). The PT-602CZ camera must be mounted upright on top of the mounting surface, with the base below the camera. The unit should not be hung upside down.

Not to scale

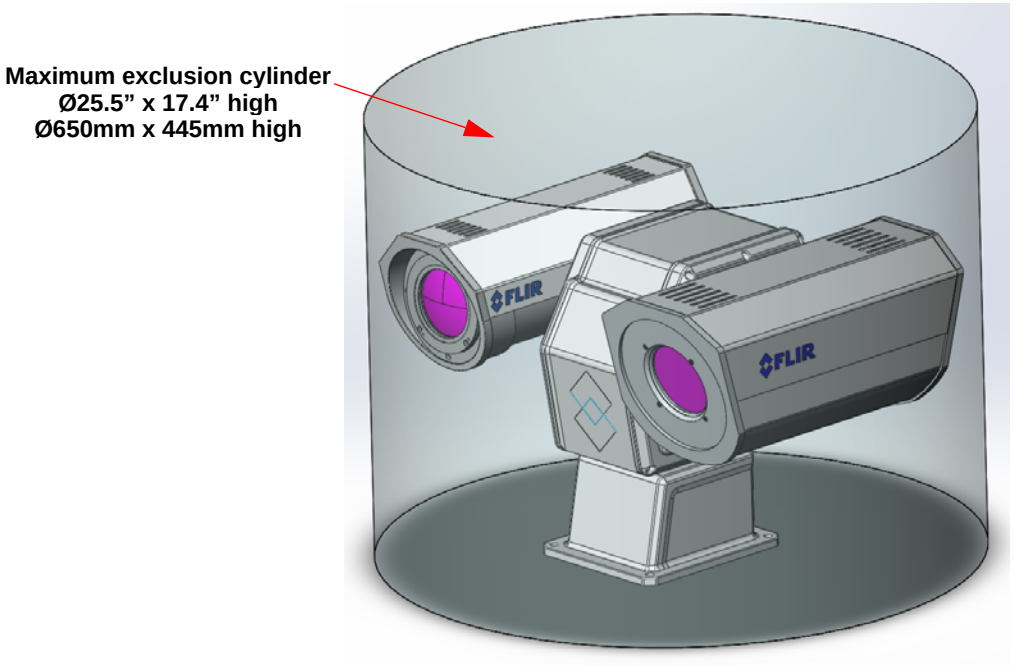


Figure 1-2: PT-602CZ Pan and Tilt Exclusion Zone

1.6 Prior to Cutting/Drilling Holes

When selecting a mounting location for the PT-602CZ camera, consider cable lengths and cable routing. Ensure the cables are long enough given the proposed mounting locations and cable routing requirements. Use cables that have sufficient dimensions to ensure safety (for power cables) and adequate signal strength (for video and communications).

Ensure that cable distances do not exceed the Referenced Standard specifications and adhere to all local and Industry Standards, Codes, and Best Practices.

1.7 Camera Mounting

Caution!

When lifting the PT-602CZ camera use the camera body and base, not the tubes.

The PT-602CZ camera can be secured to the mount with four 5/16 or M8 bolts, as shown below.

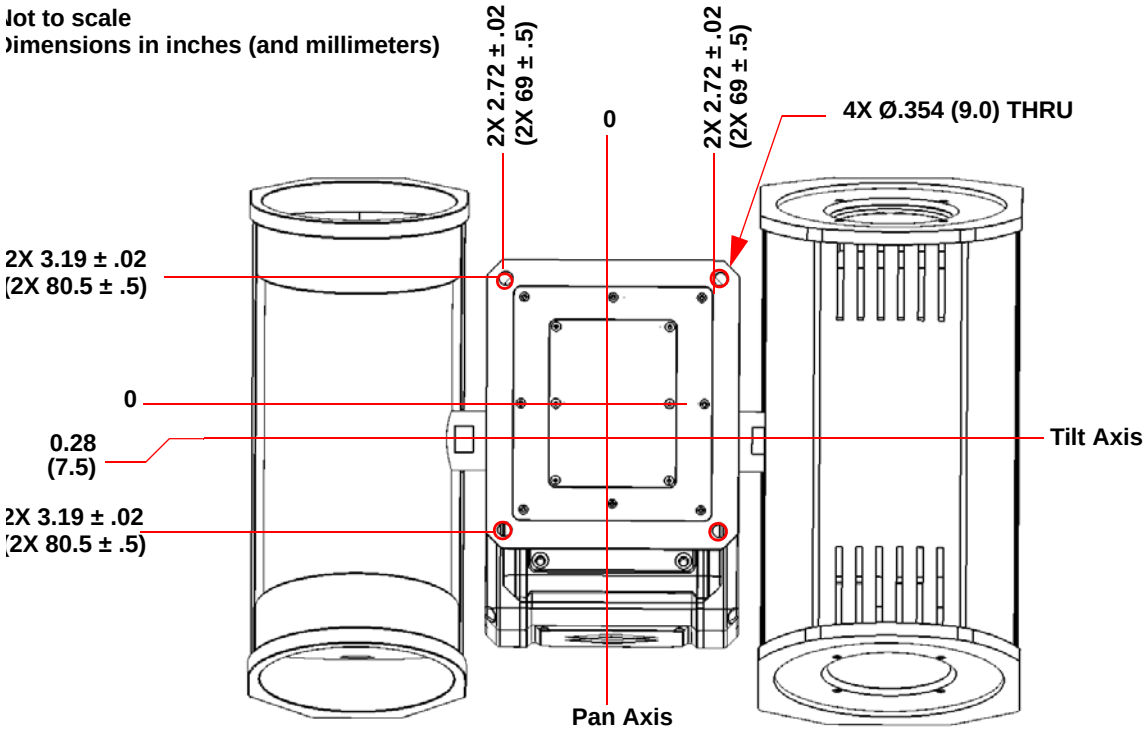


Figure 1-3: PT-602CZ Camera Mounting

Once the mounting location has been selected, verify both sides of the mounting surface are accessible.

Important Note

Connect and operate the camera as a bench test at ground level prior to mounting the camera in its final location.

Once the holes are drilled in the mounting surface, install four (4) 5/16 or M8 bolts through the base of the camera. Use a thread locking compound such as Loctite 242 or equivalent with all metal to metal threaded connections.

1.8 Removing the Back Cover

Use a cross-tip screwdriver to loosen the six captive screws and remove the cover, exposing the connections at the back of the camera. There is a grounding wire connected between the case and the back cover; if the wire is temporarily disconnected during installation, reconnect the wire to ensure proper grounding.

1.8.1 Cable Gland Sealing

Proper installation of cable sealing glands and use of appropriate elastomer inserts is critical to long term reliability. Cables enter the camera mount enclosure through liquid-tight compression glands. Be sure to insert the cables through the cable glands on the enclosure before terminating and connecting them (the connectors will not fit through the cable gland). Leave the gland nuts loosened until all cable installation has been completed. Inspect and install gland fittings in the back cover with suitable leak sealant and tighten to ensure water tight fittings. Teflon tape or pipe sealant (i.e. DuPont RectorSeal T™) are suitable for this purpose.

1.8.2 Cable Glands and Spare Parts Kit

The kit contains the two 3/4” cable glands and gland seal plugs required for non-conduit installations.

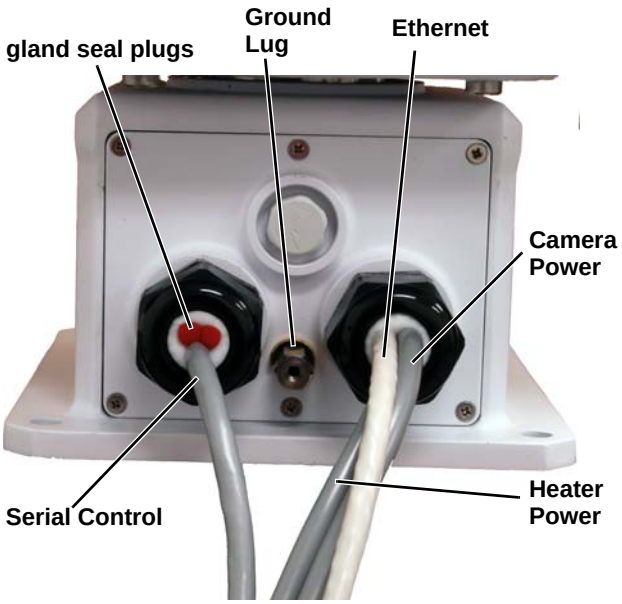
The remaining parts included in the kit are:

- a spare ground wire
- a spare ground nut and lock washer
- two spare power terminal block plugs
- two spare serial port terminal block plugs
- four spare F-Series back cover screws
- four spare PT-Series back cover screws

1.8.3 Cable Gland Seal Inserts

The PT-602CZ camera comes with two 3/4” NPT cable glands, each with a three hole gland seal insert. Cables may be between 0.23" to 0.29" (0.59cm to 0.73cm) od. Up to six cables may be installed. Plugs are required for the insert hole(s) not being used. The photograph at the right shows two power cables, an Ethernet cable, a serial control cable (no analog video is installed), and two gland seal plugs.

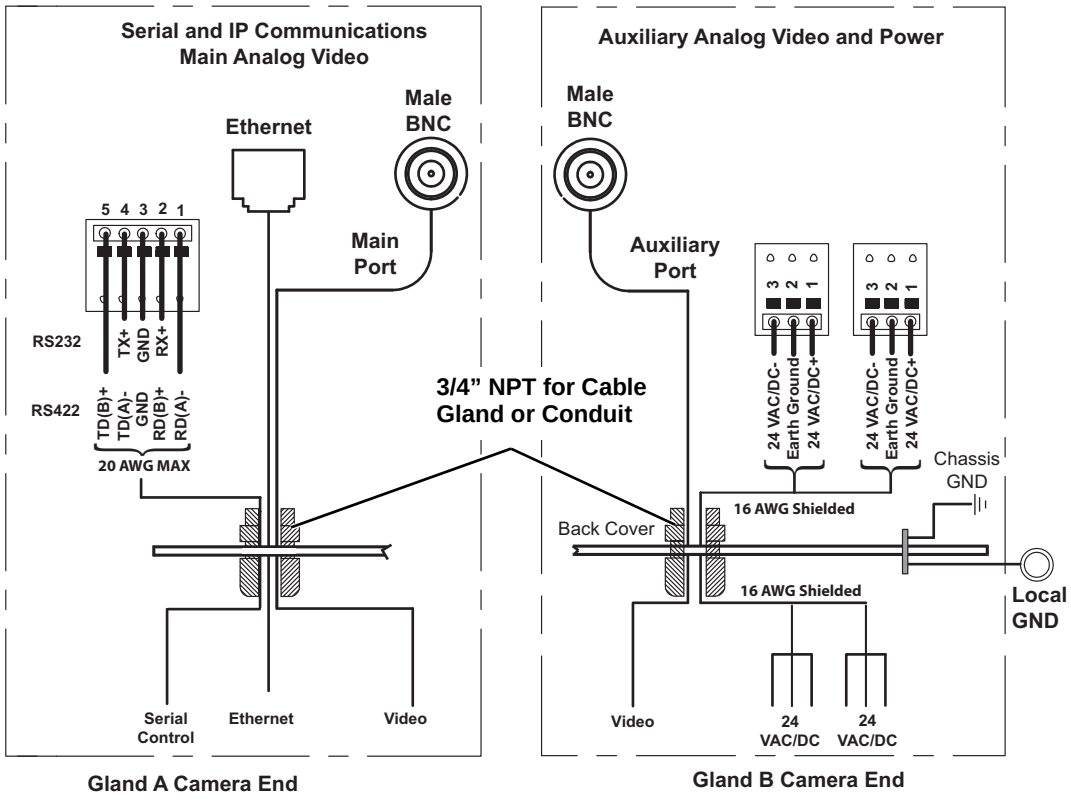
If non-standard cable diameters are used, you may need to locate or fabricate the appropriate insert to fit the desired cable. FLIR Commercial Systems, Inc. does not provide cable gland inserts other than what is supplied with the system.



Note

Insert the cables through the cable glands on the enclosure before terminating and connecting them. In general, the terminated connectors will not fit through the cable gland. If a terminated cable is required, you can make a clean, singular cut in the gland seal to install the cable into the gland seal.

1.9 Electrical Connections



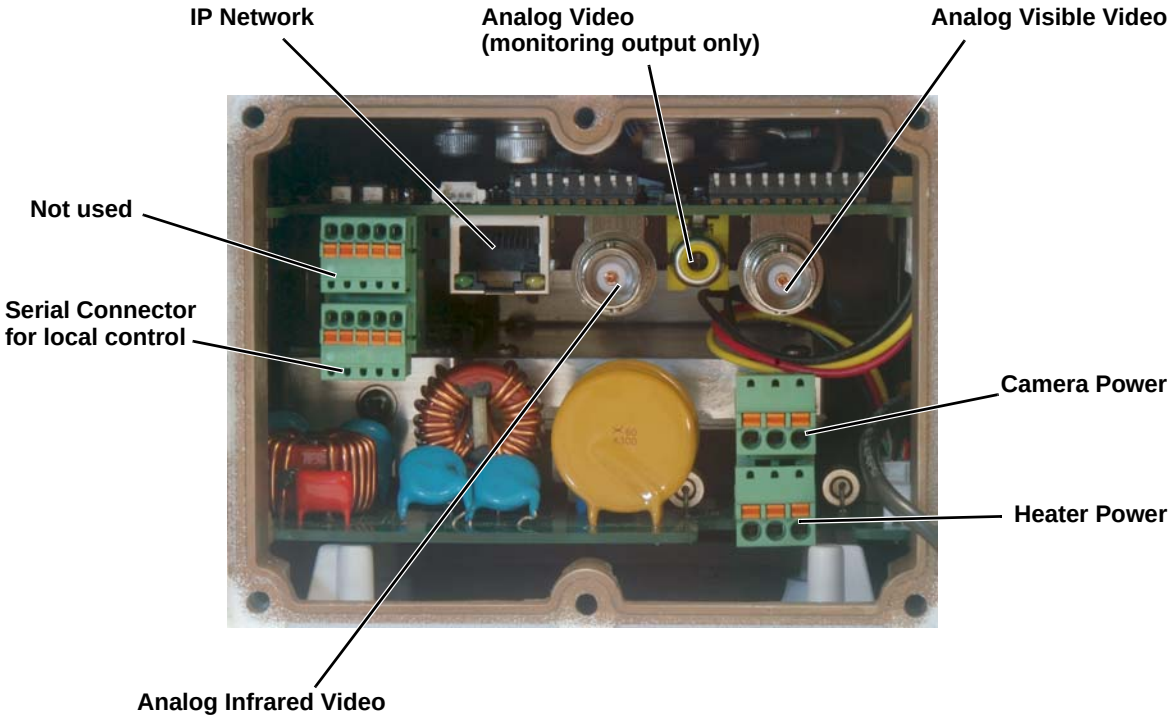


Figure 1-4: PT-602CZ Camera Connections

1.10 Connecting power

The camera itself does not have an on/off switch. Generally the PT-602CZ camera will be connected to a circuit breaker and the circuit breaker will be used to apply or remove power to the camera. If power is supplied to it, the camera will be in one of two modes: Booting Up or Powered On.

The power cable supplied by the installer must use wires that are sufficient size gauge (16 AWG recommended) for the supply voltage and length of the cable run, to ensure adequate current carrying capacity. Always follow local building codes!

Ensure the camera is properly grounded. Typical to good grounding practices, the camera chassis ground should be provided using the lowest resistance path possible. FLIR requires using a grounding strap anchored to the grounding lug on the back plate of the camera housing and connected to the nearest earth-grounding point.

Note

The terminal blocks for power connections will accept a maximum 16 AWG wire size.

1.11 Video Connections

The analog video connections on the back of the camera are BNC connectors. A video monitoring connection (RCA jack) is intended for temporary use and allows the video to be monitored without disconnecting the BNC connections.

The video cable used should be rated as RG59U or better to ensure a quality video signal.

1.12 Ethernet Connection

The camera provides a standard RJ 45 Ethernet jack. The cable gland seal is designed for use with Shielded Category 6 Ethernet cable.

1.13 Serial Communications Overview

The installer must first decide if the serial communications settings will be configured via hardware (DIP switch settings) or software. If the camera has an Ethernet connection, then generally it will be easier (and more convenient in the long run) to make configuration settings via software. Then configuration changes can be made over the network without physically accessing the camera. Also the settings can be saved to a file and backed up or restored as needed.

If the camera is configured via hardware, then configuration changes in the future may require accessing the camera on a tower or pole, dismounting it, and removing the back and so on. If the camera does not have an Ethernet connection, the DIP switches must be used to set the serial communication options.

Important Note

The serial communications parameters for the PT-602CZ camera are set or modified either via hardware DIP switch settings or via software, through a web browser interface. A single DIP switch (SW102-9, Software Override determines whether the configuration comes from the hardware DIP switches or the software settings.

Note

The DIP switches are only used to control serial communications parameters. Other settings, related to IP camera functions and so on, must be modified via software (using a web browser).

1.14 Serial Connections

For serial communications, it is necessary to set the parameters such as the signalling standard (RS-232 or RS-422), baud rate, number of stop bits, parity and so on. It is also necessary to select the communication protocol used (either Pelco D or Bosch) and the camera address.

Note

Typical Bosch systems operate using a biphase connection and the FLIR cameras do not accept biphase signals directly. It may be necessary to install a biphase converter in order to use the Bosch protocol.

The camera supports RS-422 and RS-232 serial communications using common protocols. When using the RS-422 standard, ensure the transmit pair of the camera goes to the receive pair of the other device, and vice versa.

Note

The terminal blocks for serial connections will accept a maximum 20 AWG wire size.

1.15 Setting Configuration Dip Switches

The figure below shows the locations of dip switches SW102 and SW103.

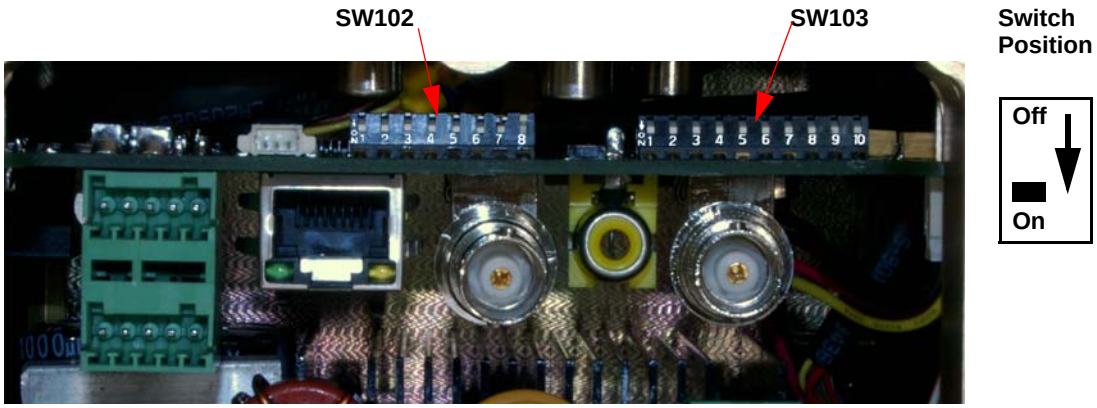


Figure 1-5: PT-602CZ Camera Configuration

Address: This is the address of the system when configured for serial communications. The available range of values is from decimal 1 to 255. The dip switches are interpreted as a binary number, with switch 1 representing the least significant bit (the switches are in the reverse order of the bits). For convenience, a table of serial addresses and their binary equivalents is included at the end of the manual. See “Serial Addresses: Decimal To Binary Conversion” on page 4-1.

Table 1-1: Dip Switch Address/ID Settings—SW102

Address	Sw1	Sw 2	Sw 3	Sw4	Sw 5	Sw 6	Sw 7	Sw 8
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
…	…	…	…	…	…	…	…	…
255	ON	ON	ON	ON	ON	ON	ON	ON

Other Serial Communication Parameters. The tables below defines the switch locations, bit numbering and on/off settings.

Table 1-2: Dip Switch Settings—SW103

	Settings		Description
Baud rate: This is the baud rate of the system user serial port. The available values are 2400, 4800, 9600, 19200 kbaud.	**Bit 1**	**Bit 2**	
	OFF	OFF	2400
	ON	OFF	4800
	OFF	ON	9600
	ON	ON	19200

Table 1-2: Dip Switch Settings—SW103

	Settings		Description
Camera Control Protocol: This is the communication protocol selected for the system when operating over the serial port. The available protocols are Pelco-D and Bosch (see Note below regarding Bosch systems).	**Bit 3**	**Bit 4**	
	OFF	OFF	Pelco-D
	ON	OFF	NA
	OFF	ON	Bosch
	ON	ON	NA
Serial Communication Standard: This determines the electrical interface selected for the user serial port. The available settings are RS422 and RS232.	**Bit 5**	**Bit 6**	
	OFF	OFF	NA
	ON	OFF	RS422
	OFF	ON	RS232
	ON	ON	N/A
Not Used	**Bit 7**	**Bit 8**	
	X	X	
	X	X	
	X	X	
	X	X	
Software Override DIP Switch: This setting determines whether the system will use software settings for configuration or if the dip switch settings will override the software settings. Default is Off.	**Bit 9**		
	OFF		Software select
	ON		Hardware select
Not Used	**Bit 10**		
	X		

Note

Typical Bosch systems operate using a biphase connection and the FLIR cameras do not accept biphase signals directly. It may be necessary to install a biphase converter in order to use the Bosch protocol.

1.16 PT-602CZ Camera Specifications

Thermal Camera Specifications	
Array Format	640 × 480 (NTSC), 640 x 512 (PAL)
Detector Type	Cooled Mercury Cadmium Telluride (MCT)
Spectral Range	3.7 to 4.8 µm
Thermal Sensitivity	<30 mK @ 25 °C
Effective Resolution	307,200 (NTSC), 327,680 (PAL)
Field Of View	WFOV: 28° x 22.4° (PAL) 28° x 21° (NTSC) NFOV: 2° x 1.6° (PAL) 2° x 1.5° (NTSC)
Focus	Auto focus or manual focus
Optical zoom	Continuous
Image frequency	25 Hz / 30 Hz video standard PAL/NTSC
Visible Camera Specifications	
Detector Type	1/4” Exview HAD CCD
Effective resolution	380,000 (NTSC), 444,000 (PAL)
Field Of View	Field of view: 57.8° (H) to 1.7° (H)
Lens	3.4mm (wide) to 122.4 mm (narrow), F1.6 to F4.5
Outputs	
Composite Video	NTSC or PAL Standard
Video Streaming	MPEG-4, H.264, or M-JPEG
Control	
Ethernet	FLIR Sensors Manager Standard
Serial	RS-232/-422 (Pelco D, Bosch)
External Analytics Compatible	yes
Pan/Tilt	
Pan Angle/Speed	Continuous 360°; 0.1° to 60°/sec
Tilt Angle/Speed	+90° to -90°; 0.1° to 30°/sec
Programmable presets	128
General	
Weight	~40 lb (18.5kg)
Dimensions (L,W,H)	13.8” × 19” × 13.1” (352 mm x 495 mm x 333 mm)
Power	
Input Voltage	24 VAC (21-30 VAC) ; 24 VDC (21-30 VDC)
Power Consumption	24 VAC: 70 VA max w/o heaters; 260 VA w/heaters 24VDC: 60 W max w/o heaters; 230W w/heaters

Note

Power consumption is independent of the input voltage when the heater is off. The power drawn by the heaters increases with the input voltage to a maximum at 30 Volts.

2 Verify Camera Operation

Prior to installing the camera, use a bench test to verify camera operation and configure the camera for the local network. The camera provides analog video and can be controlled through either serial or IP communications providing streaming video over an IP network.

2.1 Power and analog video

Step 1 Connect the power, video, and serial cables to the camera as described in section 1.9 “Electrical Connections” on page 1-7.

Step 2 Connect the video cable from the camera to a display/monitor and connect the power cable to a power supply.
The camera operates on 21 - 30 VAC or 21 - 30 VDC.
Verify that video is displayed on the monitor.

Step 3 If serial communications will be used, connect the serial cable from the camera to a serial device such as a keyboard, and confirm that the camera is responding to serial commands.
Before using serial communications, it may be necessary to configure the camera to operate with the serial device.

2.2 Initial Power Up

After the connections have been made, apply power to the camera. After the camera is turned and the server has booted up (approximately 90 seconds), the video temporarily displays system information including the serial number, IP address, Pelco address, Baud rate, and setting of the serial control DIP switch: SW - software control (the default) or HW - hardware.For example:

S/N: 1234567
IP Addr: 192.168.250.116
PelcoD (Addr:1): 2400 SW

Just after the power is turned on, the zoom lens will execute a Built In Test (BIT). Then it will be automatically set to the wide field of view (28°).

2.2.1 Cool Down Period

The thermal imager is cooled by a compact integral Stirling cooler (also known as a cryocooler) which starts automatically when the camera is powered on. The cryocooler makes an audible noise when it is operating, and it requires up to 8 minutes to cool the detector down to its operating temperature. When it is cooling down, the video image shows a fixed test pattern, rather than live video.

2.3 Verify Serial Communications

If using serial communications with the camera, use the serial control device (such as a keyboard) to move the camera pan/tilt and zoom in/out. By default, commands from a serial device have higher priority than commands from an IP client such as FLIR Sensors manager.

The camera supports the following Pelco D Aux commands.

Pelco command	Command	PT series
Aux 1 ON	FF 01 00 09 00 01 0B	IR polarity Black Hot
Aux 1 OFF	FF 01 00 0B 00 01 0D	IR polarity White Hot
Aux 2 ON	FF 01 00 09 00 02 0C	DLTV change active source
Aux 2 OFF	FF 01 00 0B 00 02 0E	IR change active source
Aux 3 OFF	FF 01 00 0B 00 03 0F	Toggle AGC type (manual/auto)
Aux 4 ON	FF 01 00 09 00 04 0E	Toggle Autofocus
Aux 4 OFF	FF 01 00 0B 00 04 10	IR start NUC calibration (blurred NUC)
Aux 5 OFF	FF 01 00 0B 00 05 11	Toggle IR polarity White Hot/Black Hot
Aux 9 OFF	FF 01 00 0B 00 09 15	Go to Park Position

2.4 Verify IP Communications

As shipped from the factory, the PT-602CZ camera has an IP address of 192.168.250.116 with a netmask of 255.255.255.0.

Step 1 Configure a laptop or PC with another IP address from this network (for example, 192.168.250.1).

Step 2 Connect the camera and the laptop to the same Ethernet switch (or back-to-back with an Ethernet crossover cable).[1]

Step 3 Open a web browser, enter **http://192.168.250.116** in the address bar, and press Enter.

The Web Configuration Tool will start at the Login screen. If the Login screen appears, then you have established IP communications with the camera. It is not necessary to log in and use the Web Configuration Tool right away. At this time, perform a bench test of the camera using the FLIR Sensors Manager software and the factory configured IP address. Refer to section 2.5 “Using FLIR Sensors Manager (FSM)” on page 2-3 for more information.

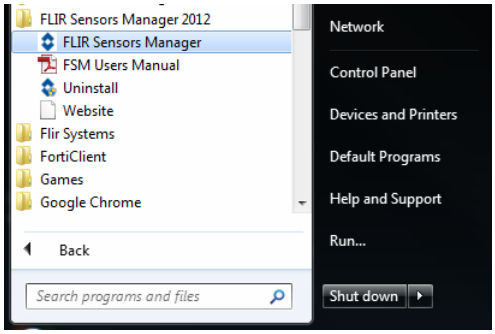
1. In some cases, a straight Ethernet cable can be used, because many PCs have auto detect Ethernet interfaces.

2.5 Using FLIR Sensors Manager (FSM)

The following provides a brief description of how to use FSM to control a camera and stream video from the camera. For more detailed information on how to use FSM, refer to the FLIR Sensors Manager User Manual.If the FSM software has not been installed yet, locate the CD that came with the camera (or download it from http://support.flir.com/) and install it on the PC.

2.5.1 Running FSM

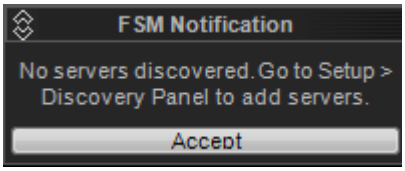
Step 1 Run the FSM software by double clicking the icon on the desktop, or click on the Windows Start button and select Programs > FLIR Sensors Manager 2012 > FLIR Sensors Manager.



Initially the FLIR Sensors Manager splash screen will be displayed. The software version may be different than the version displayed below.

After a brief while, the FSM main window will appear, and a popup FSM Notification window will appear in the lower right of the screen indicating that no cameras (servers) have been discovered yet.

Step 2 Click on the Accept button to acknowledge the notification.

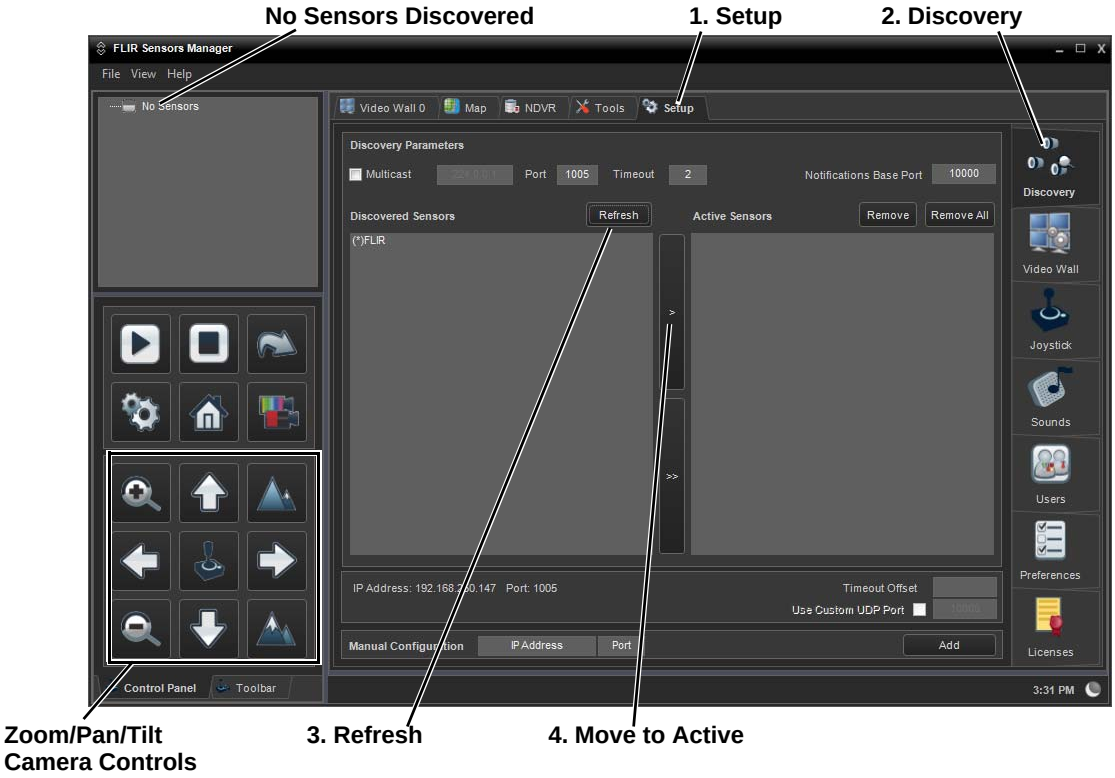


The FLIR Sensors Manager uses a “client/server” architecture. The FSM software is considered a client, and the cameras are considered servers or sensors.
The Sensors Panel in the upper left of the window indicates no sensors have been discovered and added to the list of Active Sensors.

Step 3 Click on **Setup**, then the **Discovery** button on the side panel to bring up the Discovery Panel. The FSM software can automatically discover FLIR cameras on the network.

Step 4 When the Discovery Panel is displayed, click Refresh.
The FLIR camera will appear in the list of Discovered Servers. The camera will appear as “(*)FLIR”, and the asterisk in parenthesis “(*)” indicates the camera has not been added to the list of Active Servers on the right.

Step 5 Click on the center bar “>” to move the camera over to the list of Active Servers.
By default, the FSM software will automatically discover sensors in the network, connect to the first camera it finds, take control of the camera, and display the video from the camera in Video Wall 0.



Step 6 Confirm that video is streamed to the monitor and it is possible to control the camera using the zoom controls and so on. For example, click on the zoom button (magnifying glass with +), and the video will zoom in. Once operation of the camera has been confirmed, the camera can be configured to an IP address that matches the installation network.

Step 7 Return to the Web Configuration Tool screen shown at the right and select **Login as Basic User** or enter **basic** as the User and click **Login**.
No password is required.

The Web Configuration Tool will display the Help screen listing information on the camera's software and hardware configuration. The menu on the left allows you to select various configuration web pages in order to set the camera parameters.

Refer to section "Refer to the Nexus IP Camera Configuration Guide (FLIR document # 427-0030-00-28) for more information about camera configuration." on page 2-5 for basic information about how to configure the camera for your network and application.

Refer to the Nexus IP Camera Configuration Guide (FLIR document # 427-0030-00-28) for more information about camera configuration.

2.5.2 Non- Uniformity Correction (NUC)

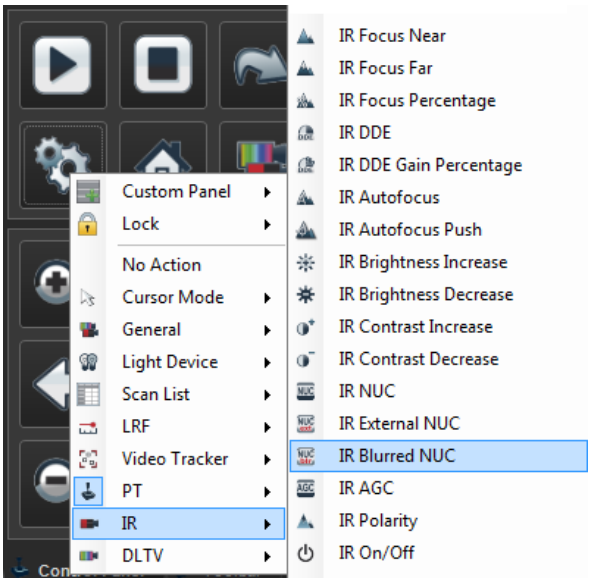
To account for pixel variations across the detector array (640x512 = 327,680 pixels), it is recommended a NUC operation is executed each time the camera is powered up, and periodically or as needed after that to improve the quality of the image. If there is a change in ambient temperature or if the camera integration time is adjusted, it may be necessary to perform a NUC operation.

A NUC operation is in some ways like a brief calibration step. With a one-point external NUC, the objective is to point the camera toward a fairly uniform temperature source, then get a "reading" from each pixel. The average temperature is calculated, and each pixel is corrected with a factor based on it's offset from average.

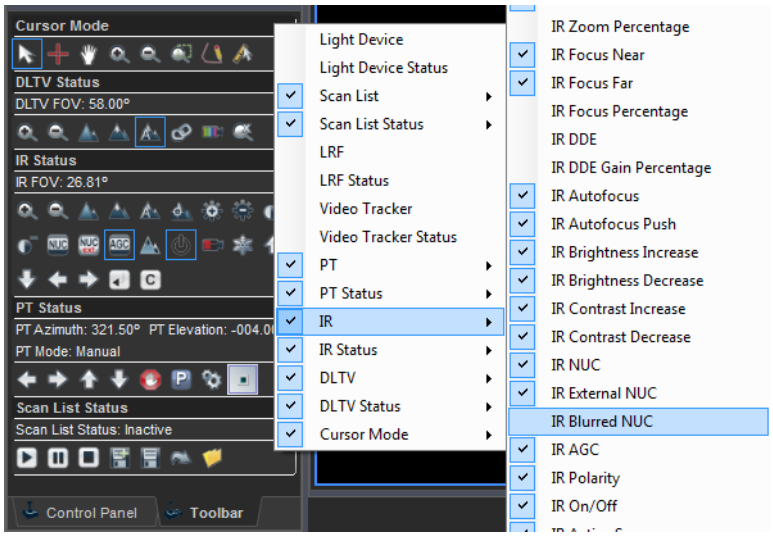
When a fairly uniform temperature scene is available (such as the sky, for example), the fastest method is to point the camera toward the scene and execute an External NUC operation.The video momentarily freezes and the NUC is performed in under a second. During the NUC, the lens can be in any zoom position, but it is preferable to have the lens zoomed in to the NFOV position.

Alternatively, it is possible to use the Blurred NUC operation, whereby the camera can point at an ordinary scene, and the lens is temporarily moved to a blurred position as part of the NUC. The disadvantage is the Blurred NUC is that it takes approximately 40 seconds to complete, and the video is frozen on the current scene while executing the operation. This type of NUC does not require a completely uniform scene, but it works best when the scene does not have high contrast (large temperature variations).

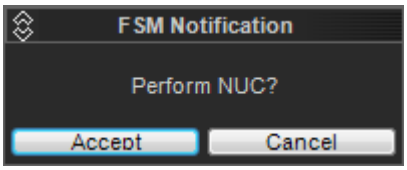
Using FSM, there are several possible methods for performing a NUC. Various buttons on the Control Panel or Toolbar can be used to execute a NUC operation. By default in FSM, the NUC buttons are not displayed on the Control Panel. It is possible to reassign one of the buttons that is not used often (for example, the PT Initialize button is not needed for the PT-602CZ, since the pan/tilt initializes automatically at startup). To reassign the button, right click on the button, and select an alternate function from the pop-up menu.



Similarly, if using the Toolbar, it is possible to right-click anywhere on the Toolbar and turn on or turn off a button by selecting it or deselecting it. The IR External NUC button is enabled by default but the IR Blurred NUC button is not enabled.



To execute either NUC operation with FSM, it is necessary to have control of the camera and the camera must be the active camera. When the NUC button is selected, a pop-up notification appears in the lower right of the screen.When the Accept button is selected, the NUC operation begins.



Note

Since the PT-602CZ does not have an internal shutter, the IR NUC button has no effect on the pixels and simply causes the image to freeze momentarily.

2.6 Troubleshooting Tips

If you need help during the installation process, contact your local FLIR representative or, call 877-773-3547 inside the US.

Before using serial communications, it may be necessary to configure the camera's serial interface to operate with the other serial device. For more information, refer to section 3.3 "Serial Remote Menu" on page 3-4.

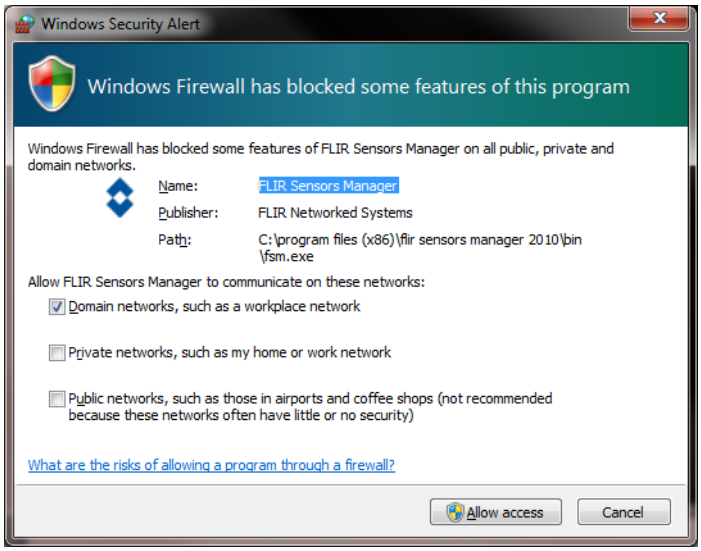
2.6.1 Camera not discovered

By default the camera will broadcast a "discovery" packet two times per second. When FSM starts up, it listens to the network for the discovery packets. If no cameras are listed in the Discovered Servers list, press the **Refresh** button. If the list is still empty, it indicates no discovery packets were received. This could be due to a wide variety of problems with the network, the PC, or the camera.

First check to ensure the physical connections are intact and that the camera is powered on and providing analog video to the monitor. Confirm that the IP address for the PC (for example, 192.168.250.1) is on the same network as the camera. When the camera is turned on, confirm the startup information is displayed on the analog monitor after approximately 90 seconds. For example:

S/N: 1234567
IP Addr: 192.168.250.116
PelcoD (Addr:1): 2400 SW

Next determine if Windows Personal Firewall is blocking the packets. You can turn off the firewall or add an exception for the FSM program. Typically when FSM runs for the first time, a pop-up notification may ask for permission to allow the FLIR Sensors Manager (fsm.exe) to communicate on the network, as in the following notification. Select the check boxes that are appropriate for your network.


Windows Security Alert
Windows Firewall has blocked some features of this program
Windows Firewall has blocked some features of FLIR Sensors Manager on all public, private and domain networks.
Name: FLIR Sensors Manager
Publisher: FLIR Networked Systems
Path: C:\program files (x86)\flir sensors manager 2010\bin \fsm.exe
Allow FLIR Sensors Manager to communicate on these networks:
Domain networks, such as a workplace network
Private networks, such as my home or work network
Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)
What are the risks of allowing a program through a firewall?
Allow access
Cancel

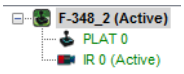
If necessary, use a packet sniffer utility such as Wireshark to capture packets and confirm the packets are being received by the PC from the camera.

2.6.2 Unable to control the camera

If you are unable to control the camera with serial communications, ensure the communication parameters of the camera (such as baud rate, address, and communication standard) match the parameters of the other serial device. If using RS-422, confirm the receive pair on the camera are connected to the transmit pair of the other device. Also confirm that the Software Override DIP switch (SW102-9) is set correctly. This switch determines whether the serial configuration comes from the hardware DIP switches or the software settings. Refer to the camera installation manual for information on how to set the DIP switches.

If the camera does not respond to commands from FSM (for example, the camera does not zoom when the zoom in button is clicked), the camera may not be the “Active” camera, or you may not have control of the camera. By default FSM will automatically request control of the camera and make it active, but if there are multiple cameras and/or multiple FSM clients, it may be necessary to manually make the camera active and take control of it.

In the Sensors Panel, if the camera is the active sensor, there will be an “**(Active)**” notification next to the name of the camera. Only one camera or sensor can be active at a time. To make the camera active, right click on the icon to the left of the camera name and select “Set Active”, or simply double-click on the icon.



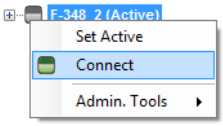
The icon to the left of the camera name indicates the status of the sensor. The following is a list of the possible icons and the meaning of each one.

Connected and Controlled

This icon indicates the camera has been discovered and added to the list of active servers, and the camera is actively “connected” to the FSM client and receiving status updates. The joystick in the icon indicates the user has control of the camera. To release control of the camera, right click on the icon and select “Release Control”.

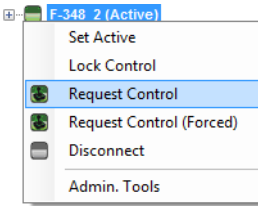
Discovered

This icon indicates the camera has been discovered and added to the list of active servers, but the camera is not actively “connected” to FSM, and therefore FSM is not receiving status updates. To connect to the camera, right click on the icon and select “Connect”. Alternatively, it is possible to double-click the icon to connect.



Connected

This icon indicates the camera has been discovered and added to the list of active servers, and the camera is actively “connected” to FSM and receiving status updates. To take control of the camera, right click on the icon and select “Request Control”. Alternatively, it is possible to double-click the icon to take control.

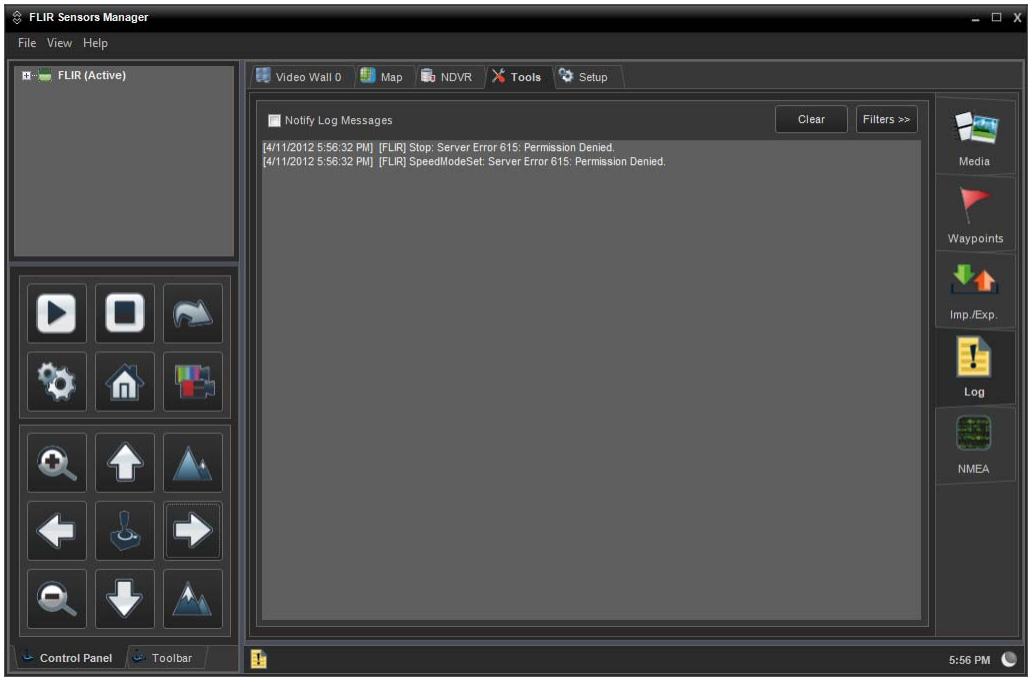


Not Connected

This icon indicates the camera has been discovered and added to the list of active servers, and the camera is actively “connected” to the FSM client and receiving status updates. To connect to the camera, right click on the icon and select “Connect”.

2.6.3 General Errors

In the status bar at the bottom of the screen there may be an indication that an error has occurred. When you position the cursor over the error icon (exclamation mark), the error will be displayed in a temporary pop-up. It is possible to view all the error messages by selecting the **Tools** tab at the top of he screen, and then select the **Log** button to the left.



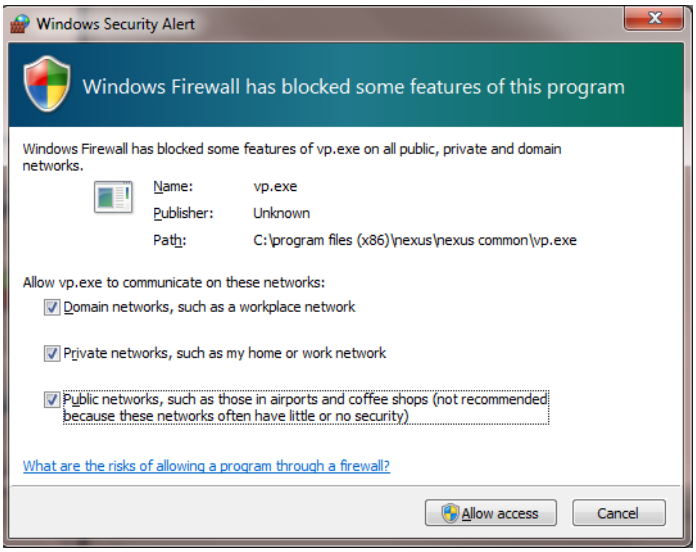
2.6.4 Image Artifacts (Ghosting) in the Video

If the camera is pointed at a non-uniform temperature scene when the External NUC operation is executed, it is likely the video image will contain artifacts or ghosting as a result. Point the camera at a uniform temperature source (for example, the sky) and execute the External NUC again. For best results, position the lens in the NFOV zoom position.

2.6.5 Unable to View Video Stream

If the video stream from the camera is not displayed in FSM, it could be that the packets are blocked by the firewall, or there could be a conflict with video codecs that are installed for other video programs.

When displaying video with FSM for the first time, the Windows Personal Firewall may ask for permission to allow the FLIR Video Player (vp.exe) to communicate on the network, as in the following notification. Select the check boxes that are appropriate for your network.


Windows Security Alert
Windows Firewall has blocked some features of this program
Windows Firewall has blocked some features of vp.exe on all public, private and domain networks.
Name: vp.exe
Publisher: Unknown
Path: C:\program files (x86)\nexus\nexus common\vp.exe
Allow vp.exe to communicate on these networks:
Domain networks, such as a workplace network
Private networks, such as my home or work network
Public networks, such as those in airports and coffee shops (not recommended because these networks often have little or no security)
What are the risks of allowing a program through a firewall?
Allow access
Cancel

If necessary, test to make sure the video from the camera can be viewed by a generic video player such as VLC media player (http://www.videolan.org/vlc/).To view the video stream, specify RTSP port 554 and the appropriate stream name such as “ch0”. For example: rtsp://192.168.250.116:554/ch0.

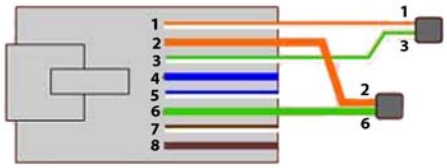
Refer to the Nexus IP Camera Configuration Guide for more information about video streaming parameters.

2.7 Restoring the Factory Network Settings

The camera comes configured from the factory with a default IP address (192.168.250.116). In some cases, it may be necessary to restore the network settings of the camera to the original factory settings. If necessary, the camera IP address can be restored to this factory default address by temporarily connecting a loopback device to the Ethernet port during initial power-up. Approximately 30 seconds after power is turned on, the loopback should be removed to allow the camera to finish booting up.

At each power-up, the system transmits a packet and then checks to determine if that same packet has been received. Detection of the received packet indicates the camera has a custom loopback connector installed on its Ethernet interface. The detection of the loopback packet cues the camera to restore Factory Defaults and to revert to the same configuration and behavior as when the camera left the factory.

The custom loopback connector is described below.



Pin #	Signal	Tied to pin #
1	Transmit +	3
2	Transmit -	6
3	Receive +	1
4	Unused	N/A
5	Unused	N/A
6	Receive -	2
7	Unused	N/A
8	Unused	N/A

The RJ45 loopback termination ties pin 1 to pin 3, and pin 2 to pin 6. The other pins are not connected.

Important Note

The camera will not finish booting up when the loopback is connected to the Ethernet. Approximately 30 seconds after power is turned on, the loopback should be removed to allow the camera to finish booting up.

When the camera is turned on, confirm the startup information is displayed on the analog monitor after approximately 90 seconds. For example:

S/N: 1234567
IP Addr: 192.168.250.116
PelcoD (Addr:1): 9600 SW

3 PT-602CZ Configuration

After logging in as “basic”, the Help screen is displayed. This screen has information about the camera including hardware and software revision numbers, part numbers, and serial numbers. If you need to contact FLIR for support, this information will be useful to the support engineer. Use the Menu entries at the left of the screen shown in Figure 3-1 to configure the PT-602CZ camera.

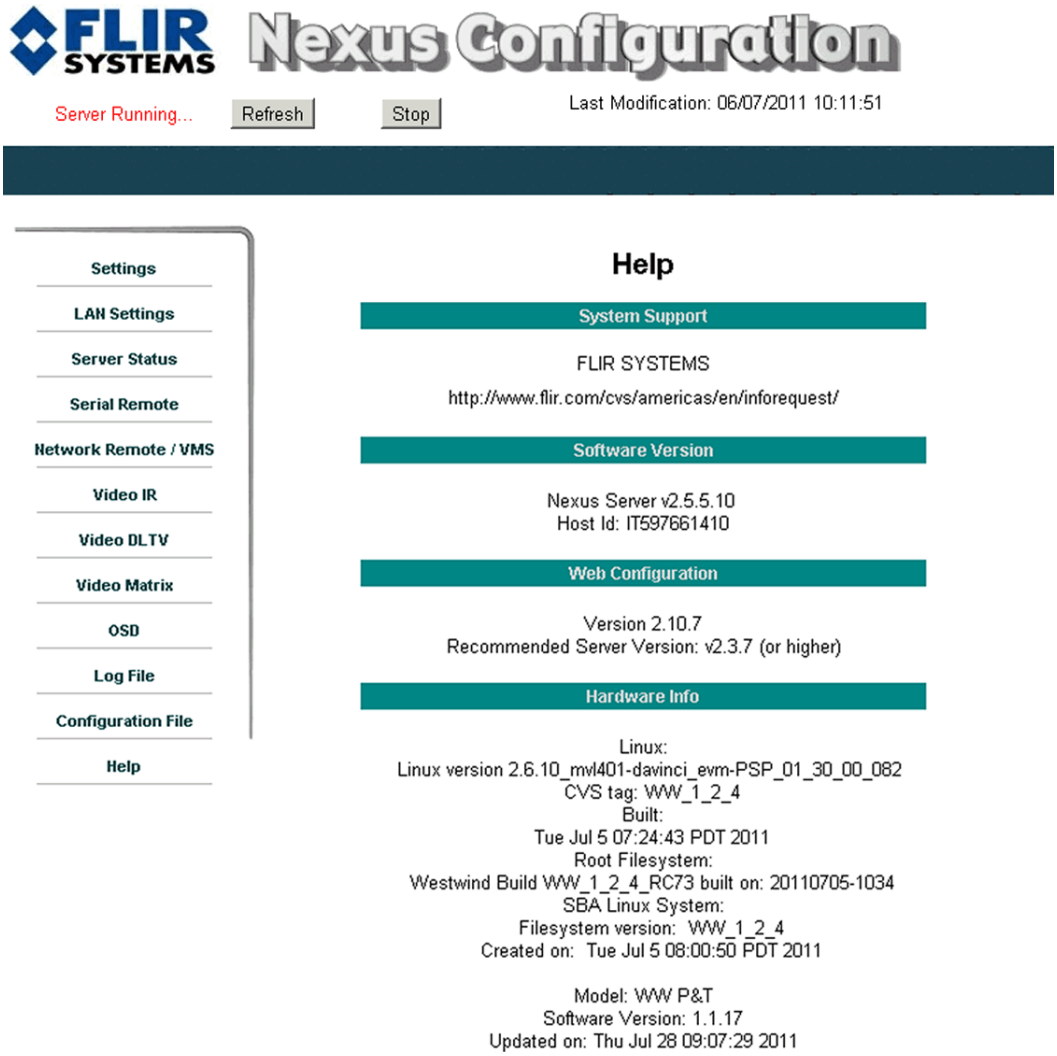


Figure 3-1: Web Configuration Tool Help Screen

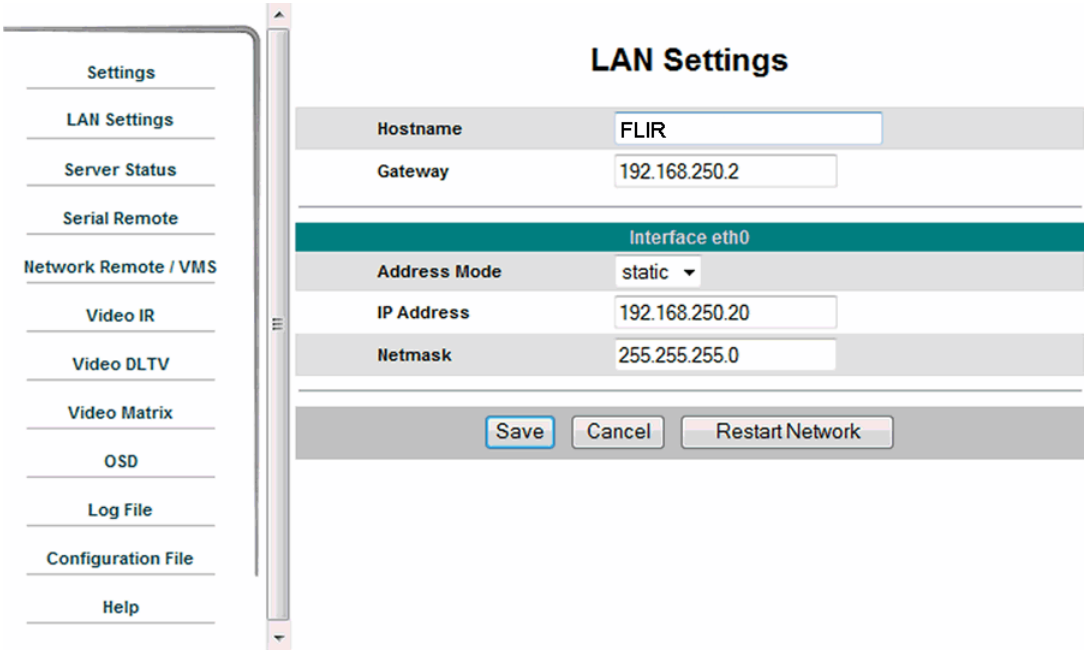
The following paragraphs show how to configure some of the most commonly set parameters, such as a new IP address for a camera on a local area network, the camera date and time, and so on.

Before making any configuration changes, it may be a good idea to save the existing configuration file. And after making any configuration changes, be sure to save a backup of the new configuration file also. Refer to paragraph 3.4 “Configuration File” on page 3-5 for information about how to save a backup.

3.1 LAN Settings

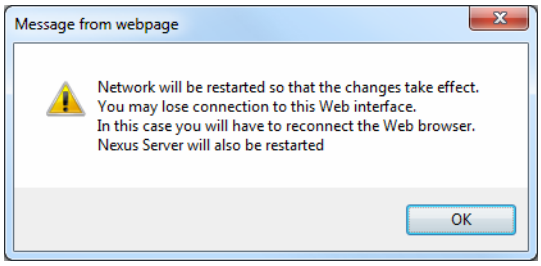
Prior to putting the camera on the video security network, it will most likely be necessary to assign a new IP address (rather than the factory IP address). Once you have changed the IP address, you typically will no longer be able to access the camera from the same PC used for the bench test until you change the IP address on the PC also.

Step 1 Click **LAN Settings**. The following screen will be displayed.



Step 2 Enter the Hostname, Gateway, IP Address, and Netmask that are appropriate for the local area network. Then click **Save**.

A message will appear indicating the IP address has been changed and the browser will no longer be able to communicate with the camera.


Message from webpage
Network will be restarted so that the changes take effect.
You may lose connection to this Web interface.
In this case you will have to reconnect the Web browser.
Nexus Server will also be restarted
OK

If necessary, change the IP address on the PC also so it is compatible with the new IP address of the camera. Connect the camera to the appropriate local area network (LAN) and continue configuring the camera again using its new IP address.

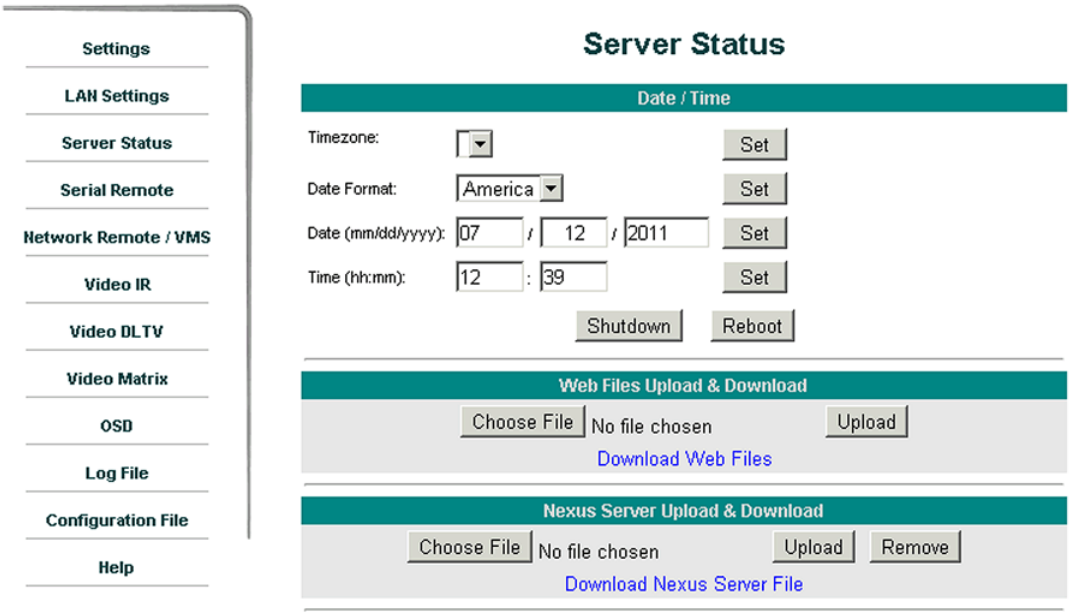
Note

In FSM, the new camera name will not appear in the Discovery Panel until the camera is rebooted. In the Server Status web page, the Reboot button can be used to initiate a camera reboot.

3.2 Date and Time

Note, you may be logged out when changing the Date or Time. Simply log back in again to continue configuring the camera. When making configuration changes, the server will have to be stopped and restarted to make the changes effective.

Step 1 Click **Server Status**. The following screen will be displayed.



Step 2 Set the Date Format from the pull down menu. Click **Set**.

Step 3 Set the Date by typing in the dialog boxes. Click **Set**.

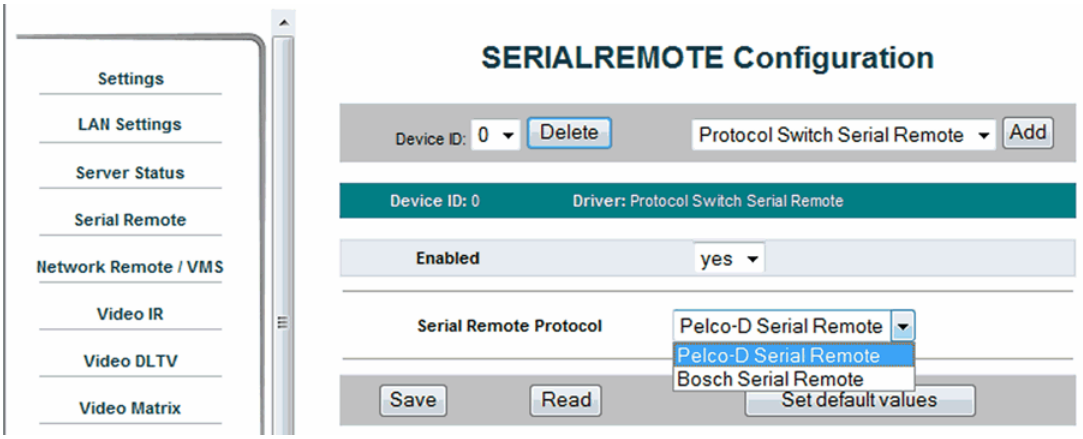
Step 4 Set the Time by typing in the dialog boxes. Click **Set**.

If it ever becomes necessary to update the camera software or firmware, the other sections of the Server Status page are used to upload the new files to the camera. Refer to the software update instructions for information about how to do an update.

3.3 Serial Remote Menu

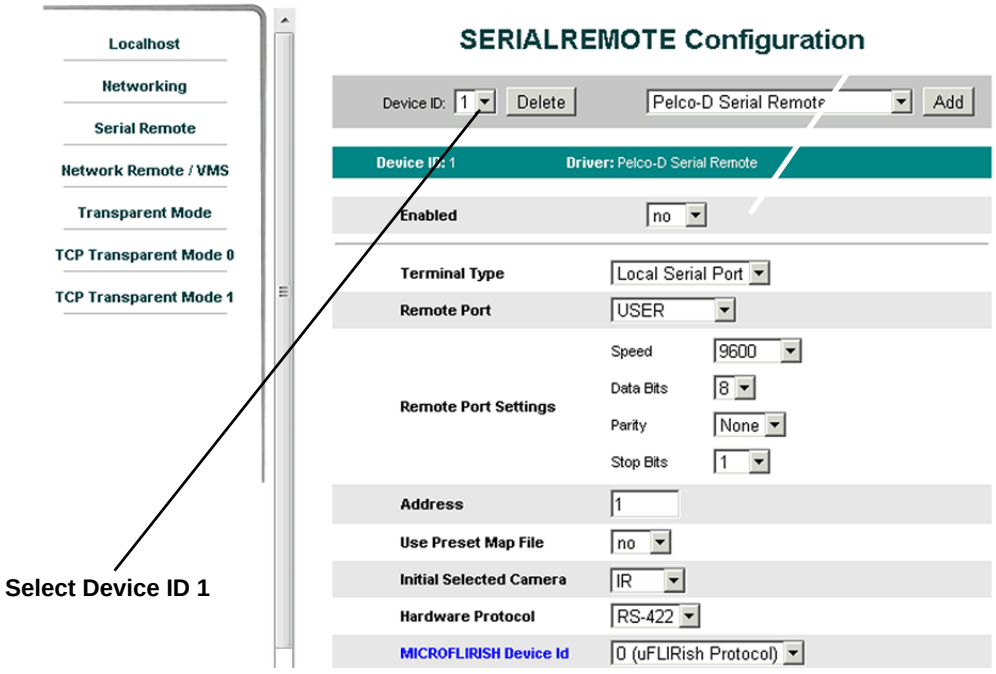
The settings you make in this screen will become active when the software override DIP switch is set to Off (the default), allowing software settings to control the camera. Refer to paragraph 1.15 “Setting Configuration Dip Switches” on page 1-10.

Step 1 Click **Serial Remote**. The following screen will be displayed.



Step 2 Select the Protocol for your serial control configuration (**Pelco-D Serial Remote** in this example).If the setting is changed, click **Save**.

Step 3 After the page refreshes, select **Device ID: 1** to see the Pelco-D settings.

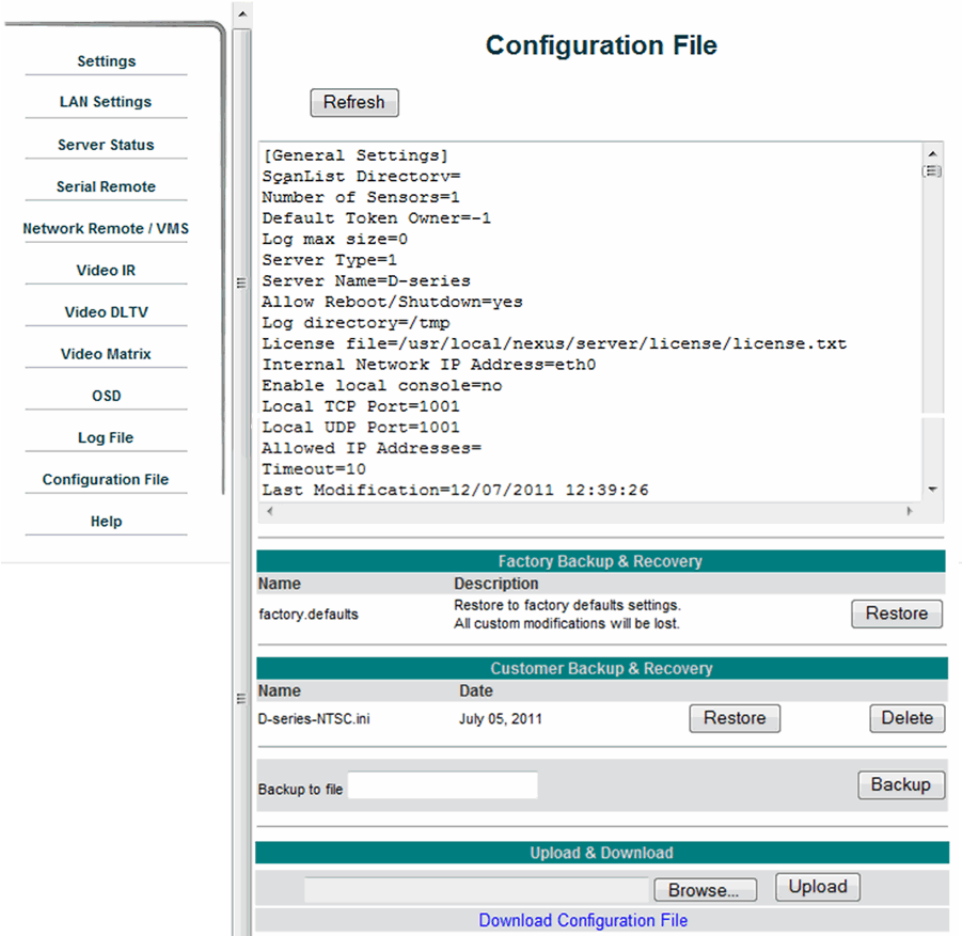


Step 4 After the page refreshes, enter the parameters for your specific location.

Step 5 After the parameters are set, select **Save** and stop and restart the server to make the changes effective.

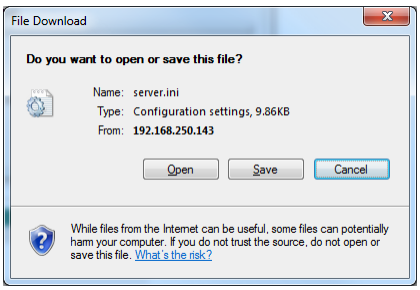
3.4 Configuration File

Step 1 Click **Configuration File**. At the top of the screen the configuration is shown in a scrollable window.



Step 2 In the Customer Backup and Recovery section, make a backup of your final custom settings.Type in a backup name and click **Backup**.

Step 3 The configuration can be downloaded as a file (server.ini) to a PC and this be useful if you ever need help from a support engineer. In the Upload and Download section, download a copy for safe keeping by selecting the Download Configuration File link.When the dialog box appears, select **Save**. After you select the location for the file, click **Save** again.


File Download
Do you want to open or save this file?
Name: server.ini
Type: Configuration settings, 9.86KB
From: 192.168.250.143
Open
Save
Cancel
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. What's the risk?

If necessary, click **Restore** in the Factory Backup and Restore section to reconfigure the camera to the settings sent from the factory. This file can not be modified or deleted, so it is always available.

3.5 Mechanical ICD Reference

The Mechanical Interface Control Document, available on the documentation CD or from the FLIR website, details the outline and mounting for the PT-602CZ cameras. These documents are provided for reference only. You may wish to consult your local sales representative or application engineer to obtain current ICD information.

4 Serial Addresses: Decimal To Binary Conversion

4 Serial Addresses: Decimal To Binary Conversion

Note, the order of the switches 1-8 is the reverse of the binary digits. For example, for address 1 the binary equivalent is 00000001 and the left-most switch (switch1) is on.

Address	Sw1	Sw 2	Sw 3	Sw4	Sw 5	Sw 6	Sw 7	Sw 8
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
…	…	…	…	…	…	…	…	…
255	ON	ON	ON	ON	ON	ON	ON	ON

The following table shows the binary equivalent for each decimal address between 1 and 255.

Decimal	Binary	Decimal	Binary	Decimal	Binary	Decimal	Binary
1	00000001	65	01000001	129	10000001	193	11000001
2	00000010	66	01000010	130	10000010	194	11000010
3	00000011	67	01000011	131	10000011	195	11000011
4	00000100	68	01000100	132	10000100	196	11000100
5	00000101	69	01000101	133	10000101	197	11000101
6	00000110	70	01000110	134	10000110	198	11000110
7	00000111	71	01000111	135	10000111	199	11000111
8	00001000	72	01001000	136	10001000	200	11001000
9	00001001	73	01001001	137	10001001	201	11001001
10	00001010	74	01001010	138	10001010	202	11001010
11	00001011	75	01001011	139	10001011	203	11001011
12	00001100	76	01001100	140	10001100	204	11001100
13	00001101	77	01001101	141	10001101	205	11001101
14	00001110	78	01001110	142	10001110	206	11001110
15	00001111	79	01001111	143	10001111	207	11001111
16	00010000	80	01010000	144	10010000	208	11010000
17	00010001	81	01010001	145	10010001	209	11010001
18	00010010	82	01010010	146	10010010	210	11010010
19	00010011	83	01010011	147	10010011	211	11010011
20	00010100	84	01010100	148	10010100	212	11010100
21	00010101	85	01010101	149	10010101	213	11010101
22	00010110	86	01010110	150	10010110	214	11010110
23	00010111	87	01010111	151	10010111	215	11010111
24	00011000	88	01011000	152	10011000	216	11011000

25	00011001	89	01011001	153	10011001	217	11011001
26	00011010	90	01011010	154	10011010	218	11011010
27	00011011	91	01011011	155	10011011	219	11011011
28	00011100	92	01011100	156	10011100	220	11011100
29	00011101	93	01011101	157	10011101	221	11011101
30	00011110	94	01011110	158	10011110	222	11011110
31	00011111	95	01011111	159	10011111	223	11011111
32	00100000	96	01100000	160	10100000	224	11100000
33	00100001	97	01100001	161	10100001	225	11100001
34	00100010	98	01100010	162	10100010	226	11100010
35	00100011	99	01100011	163	10100011	227	11100011
36	00100100	100	01100100	164	10100100	228	11100100
37	00100101	101	01100101	165	10100101	229	11100101
38	00100110	102	01100110	166	10100110	230	11100110
39	00100111	103	01100111	167	10100111	231	11100111
40	00101000	104	01101000	168	10101000	232	11101000
41	00101001	105	01101001	169	10101001	233	11101001
42	00101010	106	01101010	170	10101010	234	11101010
43	00101011	107	01101011	171	10101011	235	11101011
44	00101100	108	01101100	172	10101100	236	11101100
45	00101101	109	01101101	173	10101101	237	11101101
46	00101110	110	01101110	174	10101110	238	11101110
47	00101111	111	01101111	175	10101111	239	11101111
48	00110000	112	01110000	176	10110000	240	11110000
49	00110001	113	01110001	177	10110001	241	11110001
50	00110010	114	01110010	178	10110010	242	11110010
51	00110011	115	01110011	179	10110011	243	11110011
52	00110100	116	01110100	180	10110100	244	11110100
53	00110101	117	01110101	181	10110101	245	11110101
54	00110110	118	01110110	182	10110110	246	11110110
55	00110111	119	01110111	183	10110111	247	11110111
56	00111000	120	01111000	184	10111000	248	11111000
57	00111001	121	01111001	185	10111001	249	11111001
58	00111010	122	01111010	186	10111010	250	11111010
59	00111011	123	01111011	187	10111011	251	11111011
60	00111100	124	01111100	188	10111100	252	11111100
61	00111101	125	01111101	189	10111101	253	11111101
62	00111110	126	01111110	190	10111110	254	11111110
63	00111111	127	01111111	191	10111111	255	11111111
64	01000000	128	10000000	192	11000000		

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Document: PT-602CZ-12
Language: English (US)
Version: 100
Date: April 2012